

# Reconstruction of Fractional Quantum Hall Edges

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Edge states of quantum Hall liquids are among the most intensively studied correlated electron systems. Experiments have revealed serious inadequacy of the existing theoretical description. Our work revealed an important ingredient missing in the theory, namely edge reconstruction, which we showed can account for the discrepancy between the existing theory and experiments. [Phys. Rev. Lett. **88**, 056802 (02)]

Upper panel: Origin of edge reconstruction. The 2D electron gas and the positively charged donors form a capacitor, whose fringe electric field tends to pull electrons outward near the edge. This fringe field is the driving force of reconstruction, which gets stronger as  $d$  increases. Lower panels: excitation spectra before ( $d=1.0$ ) and after ( $d=2.0$ ) reconstruction. New excitation modes appear due to reconstruction, which are not accounted for by the existing theory.

